National Institute of Environmental Health Sciences

Climate changes, environment and infection: Facts, scenarios and growing awareness from the public health community within Europe

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Abstract:

Climate change is a current global concern and, despite continuing controversy about the extent and importance of causes and of its effects, it seems likely that it will affect the incidence and prevalence of both residual and imported infections in Europe. Climate affects mainly the range of infectious diseases, whereas weather affects the timing and intensity of outbreaks. Climate change scenarios include a change distribution of infectious diseases with warming and changes in outbreaks associated with weather extremes. The largest health impact from climate change for Europe doesn't come from vector borne infectious diseases. This does not mean that these types of health impacts will not arise in Europe. The ranges of several vector-borne diseases or their vectors are already changing in altitude due to warming. In addition, more intense weather events create conditions conductive to outbreaks of infectious diseases: Heavy rains leave insect breeding sites, drive rodents from burrows, and contaminate clean water systems. The incidence of mosquito-borne parasitic and viral diseases, are among those diseases most sensitive to climate. Climate change affect disease transmission by shifting the vector's geographic range and by shortening the pathogen incubation period. climate-related increases in temperature in sea surface and level would lead to higher incidence of waterborne infectious and toxin-related illnesses, such as cholera and seafood intoxication. Climate changes all around the world with impact in Europe are demonstrated by the fact that recent cases of cholera have been imported to Europe from Kenya, where spreading epidemic has been linked to the El Nino phenomenon, originated from the Pacific Ocean. Human migration and damage to health infrastructures from aberrant climate changes could indirectly contribute to disease transmission. Human susceptibility to infections might be further compounded by alterations in the human immune system caused by increased exposure to ultraviolet radiation and malnutrition due to alterations in agricultural products. Different kind of incidents in Europe with extreme weather events demonstrated effects on public health. The recent outbreak of the insect-borne Chikungunya virus in Italy in 2007 is an example of the kind of new health threat that the EU must be vigilant to confront. In addition, health effects of flooding, have been related to an excess cases of leptospirosis and campylobacter enteritis. Such examples have been demonstrated reported after flooding in the Czech Republic. Similarly, an increase of cryptosporidiosis in the United Kingdom has been related to flooding. Changing vector distributions associated with tickborne encephalitis and malaria have also been dempostrated in EU. A recently reported case of malaria in Italy in June 2008, suspected to be indigenously acquired, has shown how easily malaria could be reintroduced into several countries in the region. Another case of malaria in Greece in May 2010 affecting a young man living in a forestry region was claimed at KEELPNO-the Greek Center for disease control. Would this latest case be considered closely related to the one from Italy? If yes, then Public Health Services should elaborate plans to affront possible tickborne diseases. Heat waves are important causes of mortality on mortality are important. The deaths seen in France in 2003 from a heat wave are projected to

be repeated, as heat waves become more severe. However, heat waves impacts on the transmission and severity of infectious diseases have not been elucidated. Finally scientific challenges include the elucudation of climate changes and extreme weather condition impact on infection transmission and outcome, human immune system changes and infection response, outbreak scenarios, animal and plant health and public health preparedness. European action plans to affront climate changes related health and infection problems are developed by the EU Commission at different levels and jointly by different DGs. In a few words within the EU the following points on human, animal and plant health are considered a priority: * Strengthening cooperation between the services of these three branches of health (human, animals, plants); * Developing action plans in the event of extreme weather conditions, in order to be better prepared and to react in the best way; * Gathering more reliable information on the risks of climate change whilst maintaining international cooperation, in particular with the WHO, as cooperation beyond that between Member States will be required to be more effective; * Providing additional effort to identify the most effective measures; * Improving the surveillance and the control of the animal diseases. The European Commission has decided to consider climate change, and the consequences it has on health, with greater importance whilst being aware that it is at the root of numerous diseases.

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Resource Description

Communication:

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience:

audience to whom the resource is directed

Policymaker

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Extreme Weather Event, Food/Water Quality, Food/Water Security, Human Conflict/Displacement, Solar Radiation, Temperature

Extreme Weather Event: Flooding

Food/Water Quality: Pathogen

Food/Water Security: Nutritional Quality

Temperature: Extreme Heat

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Europe

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease, Malnutrition/Undernutrition

Infectious Disease: Foodborne/Waterborne Disease, Vectorborne Disease, Zoonotic Disease

Foodborne/Waterborne Disease: Campylobacteriosis, Cholera, Cryptosporidiosis, Leptospirosis

Foodborne/Waterborne Disease (other): Seafood intoxication

Vectorborne Disease: Mosquito-borne Disease, Tick-borne Disease

Mosquito-borne Disease: Chikungunya, Malaria

Tick-borne Disease: Tick-borne Encephalitis

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Elderly

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content